Also he urged that Greenwich was too far north as a situation for an observatory to fix the standard meridian, and again, that the position of Greenwich with respect to the observatories of the Continent was not then accurately known. Another speaker, whose opinions are worthy of respect, remarked that France was not alone among the countries in not joining the movement, for Spain used its own time, and also—it is to be feared that here he made a strong point—Ireland, even, still used Dublin time. It was affirmed that the motives which influenced the French authorities in this matter were purely of a scientific nature, but it may be noted that since that meeting the proposition has been brought forward in other words, namely, that the legal standard time of France shall be 9 minutes 21 seconds slow on the time of the meridian of Paris, which is not unlike the former proposal, except verbally, and it might be thought that the alteration was made so as not to hurt some susceptibilities. However, the change has not yet been made. Some of the objections above quoted have vanished, for England's naval power has as yet suffered no reverse, Spain has adopted Greenwich time, and the difference of longitude between Greenwich and Paris has been again determined, with a result which may be accepted as final. Ireland still continues to use Dublin time, it is true, but even this ought not to outweigh any advantages that might accrue from the change.

H. P. H.

THE COLOMBIAN EARTHQUAKE.

ON January 31, we learn from vague messages, an earthquake of unusual severity occurred in the north-west part of South America. The report stated that towns and villages had been destroyed, and islands had sunk. The disappearance of the latter was, however, so gradual that the inhabitants had been able to escape in boats. Later information told us about the interruption of cables, and reported that in consequence of huge sea waves a long line of coast between Buenaventura and Tumaco and the western coast of the Republic of Colombia had been devastated for many leagues. A great catastrophe had evidently occurred, but until sixteen days later the East knew but little as to what had actually taken place. The seismographs in Britain and in other countries have, however, told a story. Later we shall have another story from our Consuls and our newspapers.

In the Isle of Wight the record of some great earth adjustment commenced, as reckoned in our time, at 3h. 47m. p.m. Its maximum occurred some thirty-five minutes later. From these facts the distance at which the mass displacement had originated was known, and by a simple computation, based upon this distance, the time at the origin would be in Colombian time approximately 10h. 9m. a.m. Better that the disturbance occurred in the morning, when heavings of the ground could be felt and high waves suggesting refuge on higher ground could be seen, than it should have occurred when the inhabitants of towns and villages on a seaboard were at rest. Two hours later the effects of the initial impulses had reached their antipodes, and in the interval between these times every inhabitant of the world had been moved for at least three or four hours on a true ground swell. All the instruments in the world designed to record teleseismic motion had written records, the bubble in every spirit level had been fitfully oscillating to and fro, many magnetic needles had been caused to swing, balances had oscillated, pendulums had been accelerated or retarded—the whole world, not only on its surface, but in its depths had been shaken. The internal constitution of our planet had been disturbed, that which is hypogenic may have produced its effect upon that which was epigenic, there was a flicker in the life-history of the earth.

At this moment it is not for us to enter into the whys and wherefores of the Colombian disaster. It suddenly came upon the scene in the last day of January, but it is not yet ended. Shocks continued for the next five days, and although we are without information, they will doubtless continue for many days to come. Among other things beyond these immediate effects on life and property, we learn that volcanic stress was relieved at Cumbal. Further, we learn that on February 16 severe shocks were experienced in the Antilles. At 1.40 p.m. on that date walls were cracked in St. Vincent; similar reports come from Fort de France, and cables have been broken.

History repeats itself, and this is particularly illustrated in the seismic and volcanic history of the Central American and West Indian subterranean activities. A convulsion in the one is followed by a reaction in the other. The last illustration, which is only one of a long series, occurred in 1902, when terrific readjustments of strata in Guatemala were quickly followed by the holocaust of St. Pierre. The Colombian disaster of January 31, to which we particularly refer, is the last of a series with which seismologists are familiar. We do not know for certain, but its origin was probably suboceanic off the mouth of the Esmeralda River. We can at least say that on the line we have indicated there is a rapidly descending suboceanic gully, and that cables crossing this line have frequently been interrupted. To this we may add that here we have a district where submerged land slopes are unusually steep, and where those who lay deep-sea cables tell us that soundings have from time to time been greatly changed. Out of fifteen cable interruptions which have taken place in the district under consideration, nine of them occurred at the time when seismographs or instruments which would record teleseismic effects were set in motion in Europe. Interruptions to cables come in many ways, but from time to time we know that they have come about by sudden changes in the form of ocean floors, and off the mouth of the Esmeralda River we know that this has often happened.

NOTES.

THE appointment of officers for the seventy-sixth meeting of the British Association, which is to be held at York, has now been completed. The meeting will open on Wednesday, August 1—when the president, Dr. E. Ray Lankester, F.R.S., will deliver the presidential address—and be concluded on August 8. The following are the names of the presidents of the various sections:—A (mathematical and physical science), Principal E. H. Griffiths, F.R.S.; B (chemistry), Prof. Wyndham Dunstan, F.R.S.; C (geology), Mr. G. W. Lamplugh, F.R.S.; D (zoology), Mr. J. J. Lister, F.R.S.; E (geography), Sir G. Taubman-Goldie, K.C.M.G., F.R.S.; F (economic science and statistics), Sir George S. Gibb; G (engineering), Prof. J. A. Ewing, F.R.S.; H (anthropology), Mr. E. Sidney Hartland; I (physiology), Prof. Francis Gotch, F.R.S.; K (botany), Prof. F. W. Oliver, F.R.S.; L (educational science), Prof. M. E. Sadler. Subscriptions to the amount of more than 700*l.* have been promised to the fund started for the purpose of founding a medal to commemorate the visit of the association to South

Africa last year. The council of the association has resolved to add to the fund the balance of the special funds raised to meet the expenses of the South Africa meeting, so that the total sum to be disposed of is between 1500*l.* and 1600*l.* It is proposed that the medal, struck in bronze, together with the balance of the income on the fund after paying for the medal, shall be awarded "for achievement and promise in scientific research in South Africa," and that, so far as circumstances shall allow, the award shall be made annually.

PROFS. F. KOHLRAUSCH AND A. A. MICHELSON have been elected honorary Fellows of the Physical Society of London.

AN International Exposition, in which discoveries and inventions relating to medicine and hygiene will have a prominent place, is to be held at Antwerp in April and May of the present year, under the patronage of H.R.H. the Countess of Flanders. Communications should be addressed to the secretary's office, 26 Rue d'Arenberg, Antwerp.

THE anniversary meeting of the Geological Society was held on February 16. Sir Archibald Geikie, Sec.R.S., was elected president. The medals and funds awarded, as announced already (p. 274), were presented. The president delivered his anniversary address, which dealt with the influence of the geological structure of English lakeland upon its present features—a study in physiography.

IT is stated in the *Globe* of February 17 that the first wireless telegraph station at Machrihanish, Argyllshire, is now completed, and communication has been commenced with other stations in Great Britain. The tower, which is 400 feet high, has been built to the order of the National Electric Signalling Company, of Pittsburg, by the Brown Horsting Company, New York. The diameter of the column is about 5 feet, and consists of pipe-shaped tubes, inside of which are the ladders for ascending.

THE Milan Chemical Society has appointed a committee to undertake the compilation of a catalogue of the Italian chemical industries.

AT the invitation of the committee appointed to consider the foundation of a Chemische Reichsanstalt, a meeting was to be held yesterday in the Aula of the University of Berlin to hear an account of the steps which have already been taken by the committee, and the reasons put forward for such a chemical institution.

BY a decree of the German Chancellor, an advisory committee of specialists is to be appointed to the Imperial Biological Institute for Agriculture and Forestry. The following appointments, amongst others, have now been made to this committee, and hold good until the end of 1910:—Prof. J. Behrens, Baden; Prof. Buchner, Berlin; Prof. Delbrück, Berlin; Prof. Gärtner, Jena; Prof. Gerlach, Bromberg; Dr. Hiltner, Munich; Prof. Hollrung, Halle; Prof. Kellner, Leipzig; Prof. Kirchner, Würtemberg; Prof. Ludwig Klein, Karlsruhe; Prof. A. Koch, Göttingen; Prof. Kühn, Halle; Prof. Möller, Eberswalde; Prof. P. Wagner, Darmstadt; Prof. Wortmann, Geisenheim. The director of the Imperial Institute for Agriculture and Forestry has been elected president of the advisory committee.

ON Thursday next, March 1, Mr. Francis Darwin will deliver the first of three lectures at the Royal Institution on the "Physiology of Plants," and on March 3 Prof. J. J. Thomson will commence a course of six lectures on "The Corpuscular Theory of Matter." The Friday evening discourse on March 2 will be delivered by Dr. R. Caton, the subject being "Hippocrates and the Newly Discovered Health Temple at Cos," and on March 9 by Dr. R. Hutchison, on "Some Dietetic Problems."

THE thirty-third annual dinner of old students of the Royal School of Mines was held on February 16. After the loyal toasts, the chairman, Prof. S. H. Cox, was asked to present to Prof. J. W. Judd a service of plate with an address and an album containing the signatures of 400 of his pupils and friends in all parts of the world as a mark of their esteem on his retirement from the office of dean of the school. In the address warm appreciation is expressed of Prof. Judd's services to geological science during his tenure of the chair of geology from 1877 to 1905, and the interest he invariably showed in the work and welfare of his students. Prof. Judd, in reply, alluded to the recently published report of the Government committee, which, he said, has outlined measures that will form a basis for the re-organisation of the school as a great and flourishing institution worthy of the Empire. The wants of a technical institution are not, he continued, identical with those of a university, either of the ancient or modern type, and it will be a calamity if the distinctive features of their school are lost by its being drawn into the vortex of a university. In proposing the toast of "The School," the chairman also alluded to the report of the departmental committee, and said those associated with the school are desirous of preserving its identity and the degree of Associate of the Royal School of Mines. They one and all dread being absorbed by a huge scientific institution, of which they will become only a subsidiary branch.

AT a meeting held at the Mansion House last June it was decided to commemorate the achievements of the late Sir Henry Bessemer by a memorial, which should have for its object some educational work so far-reaching in its beneficent influence as are the results of Bessemer's invention. The memorial committee deferred the active prosecution of the scheme until the publication of the report of the departmental committee on the work of the Royal College of Science, and, now that this report has been issued, it is possible to proceed actively with the memorial scheme. The committee is confident that no memorial could be more appropriate than one which has for its object the scientific advancement of the metallurgical and mining industries, and that none would be more likely to have met with Bessemer's warm approval. It has been arranged that the objects of the memorial fund shall be:—(1) The establishment of open international memorial scholarships for post-graduate practical work tenable (except such as it is intended to allocate to the Royal School of Mines, the Sheffield and Birmingham Universities, the Armstrong College, Newcastle-upon-Tyne, or other approved British institutions) in any part of the British Empire, in the United States of America, and in Europe. It is intended that these scholarships shall be of such value, and shall be awarded under such conditions, that they will be regarded by students of any nation as a prize worth striving for, and as an incentive to the highest scientific attainment. (2) The equipment of mining and metallurgical memorial laboratories in the Royal School of Mines at South Kensington as the centre of the memorial. The land and the cost of the new buildings and maintenance for the school will be provided from Government and other sources. (3) The erection of a statue of Bessemer in the new Royal School of Mines at South Kensington. Subscriptions amounting to about 8000*l.* have already been received towards the large sum which will be required. Communications should be addressed to the Hon. Secretary, Bessemer Memorial Fund, Salisbury House, E.C., and all cheques should be made payable to the "Bessemer Memorial Fund," and crossed "Bank of England."

WE have received from the Philosophical Institute of Canterbury, New Zealand, copies of four papers by the late Captain Hutton published in the *Transactions of the New Zealand Institute* for 1904. Their respective titles are:—"The Formation of the Canterbury Plains," "The Occurrence of *Grauculus melanops* in New Zealand," "Revision of New Zealand Tertiary Brachiopoda," and "Three New Tertiary Shells."

No. 8 of vol. ii. of the zoological section of the *Publications of the University of California* is devoted to the first paper of a memoir of the "Dinoflagellata" of the San Diego district, by Mr. C. A. Cofoid. It appears that investigations carried on during the last few years at the San Diego station have brought to light amid the "plankton" of the Pacific a number of species of flagellate animalcules which cannot be referred to any known genus, and for which the new name Heterodinium is proposed.

RECENT issues of the *Proceedings of the Academy of Natural Sciences of Philadelphia* contain papers on the following subjects, viz.:—a collection of birds from British East Africa, by Mr. W. Stone; Hawaiian species of the molluscan genera Endodonta and Opeas, by Messrs. Pilsbry and Vanatta; Pacific Cerithiidæ, by the same authors; and notes on, and descriptions of, Costa Rican Orthopoda, by Prof. Rehn. In the last of these the author describes a very remarkable species of stick-insect of the family Phasmidæ, which is referred to the genus Olcyphides, Griffini, with the name of *O. viridipes*. This species, of which the figure is reproduced, is allied to Westwood's *O. venilia*, of Bogota, but differs in the shorter mesothorax and metathorax, and the much greater elongation of the abdomen and limbs, as well as in details of coloration and other points.

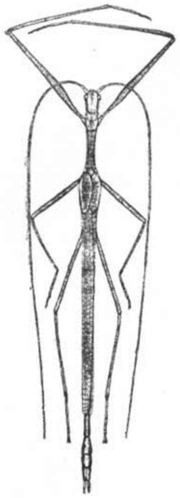


FIG. 1.—*Olcyphides viridipes*, from Costa Rica (½ natural size).

IN the November (1905) issue of the *Nature-study Review* Miss A. M. Fielde gives an interesting illustrated account of the communal life-history of ants, primarily intended for the information and guide of those who keep these insects under observation in the cases invented by the author. There are, however, many observations of special interest. Among these is the statement that ants of different species—which always display deadly hostility to one another—can be trained to live together in friendship. Mr. C. W. Wild discusses the study of deciduous trees in winter; while Mr. M. A. Bigelow ridicules the theory that certain groups of plants develop tubers or bulbs in order to escape destruction by animals.

WE have received from the author, Prof. F. Eulenburg, of the University of Leipzig, a copy of an article on society and nature ("Gesellschaft und Natur"), reprinted from the *Archiv für Sozialwissenschaft und Socialpolitik* for 1905. The subject is treated, after some introductory considerations, from the following points of view:—(1) the determination of the objects of science, especially social science; (2) the importance and necessity of social laws; (3) the threefold relation of society to nature; (4) special problems; and (5) the relations of social science to biology and practical politics.

THE felted beech coccus, *Cryptococcus fagi*, is the subject of a leaflet, No. 140, issued by the Board of Agriculture and Fisheries. The scale insects are provided with a long sucking tube by which they draw off the sap; they are stationary, and cover themselves with a white waxy secretion. The larvæ also drain the juices of the tree. Although the insects are conspicuous objects on the bark, and are principally found on the main trunk and larger branches, their waxy coverings shelter them effectively, and treatment with such insecticides as paraffin emulsion, Gillander's mixture, or caustic alkali wash must be thorough to prove efficacious.

IN the *Indian Forester* (March, 1905) Mr. R. S. Pearson stated that he had obtained satisfactory results in the Panch Mahals, Bombay, in rearing young teak plants by subjecting the seed to a preliminary treatment in pits, in which layers of seed an inch deep were arranged alternately with layers of soil, and the pit was flooded with water every other day until germination commenced. This and other experiments with seed of *Anogeissus latifolia*, described in the November issue, appear to depend upon the maintenance of a regular and sufficient, but not excessive, supply of water. Another fairly successful method consists in subjecting the seed to a slight fire that produces artificially the effects of a light forest fire in a dry teak zone.

AMONG the contributions to the *Journal of the Royal Horticultural Society* (December, 1905), Dr. M. Cooke writes an article on the fungoid pests of forest trees; Mr. G. S. Boulger, dealing with the preservation of wild plants, adduces a number of specific instances of damage done by ruthless collection; and Mr. W. G. Freeman discusses a few of the important features of the West Indian fruit industry. The method of producing new potatoes out of season from old tubers, as described by Mr. J. J. Powell, is a valuable hint to private gardeners, the essential points being retardation and a variety that keeps well. Fruit growers will be interested in the publication of the report of the committee appointed to inquire into the fruit industry, and in the notes by Mr. T. E. Sedgwick on methods of fruit preserving.

THE use of wood-pulp for paper-making was dealt with in a paper read by Mr. M. C. Phillips before the Society of Arts, and published in the Journal of the society last May. A machine for grinding wood into pulp was patented by Keller in 1844, but the modern method of making *mechanical* pulp has developed out of the machine constructed by Henry Voelter in 1858 that not only disintegrated but also assorted the fibre. The mechanical process is largely practised in Norway, Sweden, and Canada, and provides the bulk of journalistic paper. Better paper is produced by chemical processes in which the wood is treated with various chemicals that remove the ligneous and mineral constituents, leaving wood-cellulose. Tilghman (1857), Ekman, and Mitscherlich were the pioneers in this branch of the industry. The paper has been reprinted by the Government of India in connection with the experiment of producing wood-pulp in that country.

A Bulletin on "The Mineral Constituents of the Soil Solution," by Messrs. F. K. Cameron and J. M. Bell, has been received from the U.S. Department of Agriculture (Division of Soils, Bulletin 30, 1905, pp. 70). This latest publication of the division over which Mr. Whitney presides deals with the problem that has been the subject of so much of the recent work on soils done by the United States Department of Agriculture—the composition of the solution formed by the water in the soil. It is generally recognised now that plants feed on this solution and are incapable of attacking the solid constituents of the soil, so that the composition and mode of origin of this solution must furnish the interpretation of many of the difficulties regarding the relationship of crops to soils. The Bulletin is more of a general discussion and a bibliography than a record of new investigations; it sets out a brief account of most of the work that has been done on such matters as the solubility of the minerals composing the soil, the hydrolysis and similar changes then taking place, adsorption and absorption by finely powdered materials, flocculation, surface reactions, and such other phenomena in the borderland of chemistry and physics as must play a leading part in the reactions going on in the soil. The main thesis of the Bulletin is that the soil materials hydrolyse and form a solution in equilibrium with the portion which remains solid; this position of equilibrium will be continually restored or maintained whenever it is temporarily disturbed, as by the addition of manures or the withdrawal of substances by growing plants. We fail to perceive, however, that all the parade of authorities lend any support to the extraordinary doctrine which the American official soil chemists seem to have adopted as an article of faith—that all soils, whatever their origin or treatment, yield the same soil solution, and therefore possess the same nutritive power. Putting aside this "conclusion," which is brought in at the end, though nothing particular seems to have led up to it, all workers in this field will be glad to possess the Bulletin as a guide to the scattered literature on a difficult subject.

We have received from Mr. G. Henriksen, of Christiania, a translation of his pamphlet, written in Norwegian, on the iron-ore deposits of Sydvaranger, in Finmarken, Norway. Iron ore occurs in large quantities in gabbro. It consists exclusively of magnetite. The deposits are considered by the author to have been formed by the action of pressure on eruptive rocks.

It is reported in the *Engineering and Mining Journal* (vol. lxxxi., No. 4) that great development has taken place in gem production in Brazil. Exploration in Minas Geraes has led to discoveries of tourmaline which have furnished red, blue, and green gems, and of beryls which have furnished magnificent blue and green stones. A large quantity of Brazilian amethyst has been obtained from the great geode, the bulk of which was shown at the Düsseldorf Exhibition in 1902.

Up to the present time the manufacture of chilled rolls has remained purely empirical; and a paper by Mr. E. de Loisy in the *Bulletin de la Société d'Encouragement* (vol. cvii., No. 10), describing his researches made to ascertain the scientific rules that should guide the iron-founder, is therefore well worthy of careful attention. For chilled rolls for rolling steel sheets or wire rods the composition sought should be as follows:—carbon, 2·9 to 3; silicon, 0·7 to 0·9; manganese, 0·5 to 1·0; and phosphorus, 0·35 to 0·45. The addition of steel scrap to pig-iron is recommended, but the proportion should not be much above 15 per cent. The author gives a large number of analyses of chilled rolls that have lasted well in the rolling-mill.

An interesting note on prospecting in the Transbaikalian goldfields has been communicated by Mr. R. Farina to the Institution of Mining and Metallurgy (Bulletin No. 17). The district has long been famous for its gold placers. Platinum and cinnabar are also met with. The gold veins vary greatly in character. Those rich in gold are very porous, friable, and highly oxidised. The other veins are of the hard white quartz type. The best time for prospecting is March and April, when the snows have almost gone. The rocks of the country are chiefly quartz porphyry, granites, andesites, diorites, and gneiss. In a note, in the same Bulletin, on tin in Tringganu, on the east coast of the Malay Peninsula, Mr. C. G. Warnford Lock records the occurrence, in the alluvial tin fields, of monazite and xenotime in pot-holes in the granite beds of the streams.

The *Journal of the Society of Chemical Industry* (vol. xxv., No. 2) contains an interesting paper by Mr. A. H. Hiorns on the effect of certain elements on the structure of cast iron. He gives a summary of previous researches on the subject, and describes some experiments made by himself with pure cast iron to which various proportions of silicon, manganese, phosphorus, and sulphur were added. He gives illustrations showing the appearance of polished and etched surfaces examined under the microscope. In the discussion, Mr. W. Rosenhain referred to the process of heat tinting in connection with the detection of the presence of phosphorus, and pointed out two very serious difficulties that had to be overcome before satisfactory results could be obtained. These were the difficulty of obtaining the surfaces in a perfectly clean state, and the fact that the actual surface very often did not represent the real structure of the metal, because the very act of polishing tended to spread the softer constituents over the harder, and in all cases produced a definite layer of altered material.

We have received from Mr. G. T. Beilby a reprint, in pamphlet form, of his presidential address to the Glasgow University Engineering Society, delivered on January 11. In it he discusses, with a thorough mastery of his subject and with conspicuous literary skill, some of the wider aspects of modern power production for industrial purposes, more particularly with reference to the fuel resources of the country. He shows that the annual coal consumption of the United Kingdom is 167 million tons, the various channels of consumption being as follows, in millions of tons:—railways, 13; coasting steamers, 2; factories, 53; mines, 18; iron and steel industries, 28; other metals and minerals, 1; brick-works, potteries, glass-works, and chemical works, 5; gas works, 15; and domestic, 32. Taking the consumption of coal for power purposes at mines and factories as 52 million tons, a saving of some 42 million tons could be realised with time and enterprise. There are in Great Britain steam engines and boilers with a yearly output of at least 5 million horse-power. The coal consumed by these is not less than 5 lb. per indicated horse-power hour, or on the whole 40 million tons. By the use of gas engines and steam turbines the coal consumption might be reduced to 1½ lb. per indicated horse-power hour, or on the whole to 12 million tons. The saving in coal, therefore, is equal to 28 million tons, valued at 9,800,000*l*. The cost of making the change need not exceed 50,000,000*l*., or, if the power is to be delivered as electricity, 60,000,000*l*. The saving in the coal bill is equivalent to a return of 16·3 per cent. on the higher capital expenditure. In these estimates no credit has been taken for the reduction in working costs which would result from the installation of more efficient plant. In many cases this would amount to as much as the saving on coal.

ACCORDING to the *Teknisk Tidskrift*, the development of the Swedish chemical industries last year was but slight, but the following points may be noticed:—the manufacture of beet sugar has been pushed further north by the opening of a sugar factory at Linköping; the preparation of "peat spirit" has been a subject of wide and searching discussion; the increased uses of acetylene and of acetylene-acetone solutions, and the process of welding with acetylene, have much favoured the carbide industry; the manufacture of paper from wood has improved both quantitatively and qualitatively; great strides are said to have been made in electrochemical industries; much attention has been given to improving methods of producing pig-iron—a number of Gröndal, American, and newer native type combustion furnaces have been built or arranged for; in the manufacture of steel we are told that several innovations and changes have been witnessed, though no official statistics are yet available for comparisons with previous years—but it is to be noted that the Bessemer process is gradually yielding to the Martin method; an experimental electrical steel furnace has been arranged at Nykroppa; many works have introduced Bildt's method of heating boilers with generator gas; suction gas plants, combustion and petrol motors, and steam turbines have risen in popularity.

IN connection with the shortage of rainfall for 1905 in the British Isles, it is interesting to note the state of affairs at the antipodes. With regard to the rainfall of South Australia, Sir Charles Todd states that throughout the whole of the Northern Territory, the interior of the continent, the pastoral country to the northwards, and as far south over the more settled districts as Petersburg, the total rainfall of the year failed to reach the average. The summer season (November, 1904, to March, 1905) was, on the whole, dry all through the settled districts and most of the pastoral country, many stations in the southern areas having only about half the annual supply. The total for the agricultural season (April to October) was, however, generally in excess of the normal fall for this period, from Wilmington and Petersburg southwards, but north of these stations it was rather below the average.

THE construction of magic squares is a recreation which has diverted even such minds as those of Euler and Fermat; with kindred problems it still maintains its popularity. Frost extended the notion to three dimensions, and wrote a paper on "nasik cubes" (*Quart. Journ.*, 1878); in "The Theory of Path Nasiks" (Rugby: Lawrence) Mr. C. Planck has quite recently developed Frost's theory, and given several examples. His method involves the solution of sets of simultaneous linear congruences, and he considers the problem in *n* dimensions.

IN No. 5, vol. xxii., of the *Astrophysical Journal*, Mr. R. E. Loving, of the Johns Hopkins University, publishes the results of an interesting research concerning the nature and action of the metallic arc in high vacua. Having previously proved that the spectrum was characteristic of the anode only, he employed various metals as anodes in conjunction with the same platinum kathode, and on photographing the more refrangible end of the spectrum found that it was not similar to either the ordinary arc or spark spectra, but was much more like the latter than the former. The relative intensities of the lines obtained did not agree with the spark intensities or with those observed for the same lines in the chromosphere. Mr. Loving gives a tabular statement in which the relative intensities of magnesium, calcium, chromium, manganese, titanium, and iron lines in the ordinary arc and spark, the chromosphere and the arc in vacuum are compared. Other important points regarding the mechanical action of the discharge, the action of a magnetic field, and the luminosity of the anode are dealt with in Mr. Loving's paper. Brief reference might be made here to one peculiar result. The violent kathode discharge was found to have a marked deteriorating action on the glass of the tube. After being used for several days the glass was found to crack much more readily when put into a flame, and the fragments were so friable that they could easily be broken between the fingers.

MR. JOHN GOLDING AND DR. FEILMANN direct attention to a peculiar mealy flavour which occasionally develops in milk (*Journ. Soc. of Chem. Industry,* December 30, 1905). Experiments showed that copper is acted upon by milk, especially in the presence of air, and that small quantities go into solution in the milk (from 1 part to more than 100 parts per million). Fresh milk when thus contaminated is very liable to the development of a peculiar mealy flavour in sixteen to eighteen hours. This flavour seems to be due in part to the development of micro-organisms in the presence of copper, which both checks the development of the lactic organisms and plays a more direct part in the actual development of the flavour.

COLONEL FIRTH AND DR. MACFADYEN contribute to the *Journal of the Royal Sanitary Institute* (xxvii., No. 1) a record of experiments made on behalf of the Disinfectant Standardisation Committee from which they consider that the "drop" method of Messrs. Rideal and Walker is the most practical and accurate method yet devised for the testing and comparison of disinfectants, and make some valuable suggestions for carrying it out. Profs. Kenwood and Hewlett also contribute a paper on the standardisation of disinfectants, in which they show the variations which may obtain in practice and the modifying effect of organic matter on germicidal power, and urge that a large margin of safety should be allowed for all disinfectants.

THE *Journal of the Röntgen Society* (December, 1905) contains an interesting paper by Mr. Butler Burke on the action of radium and other bodies on gelatin, and the production of the so-called "radiobes," which have some likeness to micro-organisms. At first these look like mere air-bubbles, but in course of time they expand or grow, appear to contain a nuclear structure, but in the course of a fortnight or so begin to break up, and later on disappear. They are also soluble in warm water and varnish at a temperature of 35° C. Mr. Burke expresses the opinion that they are on the border-line between crystalline and organic bodies, that they cannot properly be called living, but correspond possibly to some simple form of life that existed in a far distant age.

UNDER the title of "La Fin de la Matière," Prof. H. Poincaré gives in the *Athenaeum* for February 17 a brief *résumé* of recent views of the ultimate nature of matter. The essential purpose of Prof. Poincaré's article is to define how far the idea of mass or inertia has been compromised by the results of Abraham and Kaufmann, by the speculations of Lorentz, and by the doctrine of electrons. Prof. Poincaré is careful to emphasise the assumptions on which recent views are based, but if the assumptions are correct the final result consists in stripping from matter the attribute of mass by which it is usually defined. Mass appears purely as the result of electrical action, or, in Prof. Poincaré's own striking words, "dans ce système il n'y a pas de vraie matière, il n'y a plus que des trous dans l'éther."

SOME time ago Prof. Nernst described a simple form of torsion balance capable of measuring weights of a few milligrams with an accuracy of 0·001 milligram. In the current number of the *Berichte* Mr. H. v. Wartenberg gives an interesting application of this instrument to the determination of the molecular weight of silver vapour. The method used was a modification of the well known apparatus due to Victor Meyer, the vessel being made of iridium, coated internally with a mixture of the oxides of yttrium and zirconium. This iridium vessel was heated in an electric furnace to about 2000° C., the weight of silver used in each experiment varying from 0·905 to 0·322 milligram. The values obtained for the molecular weight of the silver were between 107 and 147, indicating that silver is monatomic.

MESSRS. DAWBARN AND WARD, LTD., have published in their "Home Worker's" series a little book by Mr. Joseph E. Dangerfield on "Brass and Iron Founding." The price is 1*s.* 6*d.* net.

THE "Swincam" camera stand enables a camera to be fixed on the tripod in almost any position, so that photographs can be taken in situations which present insurmountable difficulties with ordinary stands. A revised pamphlet showing some of the possibilities and performances of this speciality in tripod stands has been issued by the maker, Mr. W. Butler, Southport.

MESSRS. WHITTAKER AND CO. have published a second edition of Mr. S. R. Bottone's "Radiography and the 'X' Rays." The book was reviewed in our issue of July 28, 1898 (vol. lviii. p. 292); and it is only necessary to say here that recent improvements in Röntgen-ray apparatus, and interesting matter connected with the therapeutic effects of the rays, are dealt with in the new edition.

OUR ASTRONOMICAL COLUMN.

COMET 1906*a*.—The following is taken from a continuation of the daily ephemeris for comet 1906*a* (Brooks), published by Herr M. Ebell in No. 4075 of the *Astronomische Nachrichten* :—

Ephemeris 12*h*. *M.T. Berlin.*

1906	α (true) h. m. s.	δ (true) ° ′	log *r*	log Δ	Brightness
Feb. 22	6 45 35	+78 30	0·2047	0·0024	0 82
24	6 21 29	+75 12	0·2094	0·0150	0·76
26	6 7 28	+71 59	0·2140	0·0288	0·69
28	5 58 38	+68 55	0·2187	0·0435	0·64
Mar. 2	5 52 47	+66 1	0·2234	0·0589	0·58
4	5 48 50	+63 19	0 2282	0·0748	0·53

It will be seen from the above that the comet is now travelling rapidly down the constellation Camelus towards Perseus, and is becoming much fainter.

A set of parabolic elements of the orbit of this object has been computed by M. E. Maubant, and appears in No. 6 (1906) of the *Comptes rendus.*

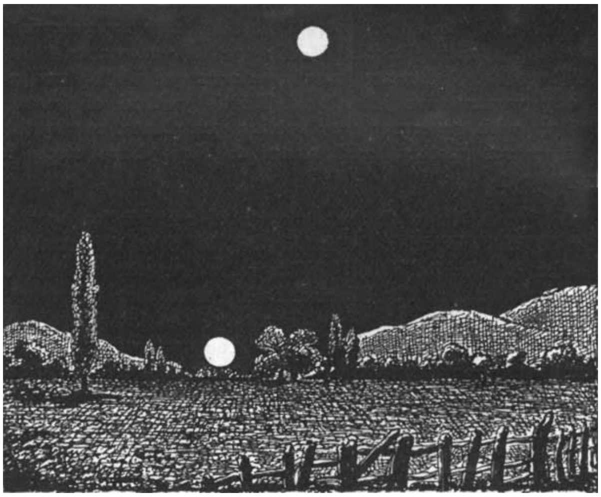
COMET 1905*c*.—Photographs of Giacobini's comet (1905*c*) obtained at Greenwich early in January showed that the magnitude was about 3·0, and that this object had a tail about 2° in length.

A note in the February number of the *Bulletin de la Société astronomique de France* quotes M. Giacobini, who, in a letter to a correspondent, stated that the comet was visible to the naked eye during the whole week preceding January 9, and that it then had a tail about 1° in length, the position angle of which was 45°. The nucleus was estimated as being of the second or third magnitude. The nearest approaches of this object to the earth took place on January 6 and February 2, the respective distances being 1·102 and 1·150 astronomical units. Its distance from the sun at perihelion was 0·2154 unit.

THE APPARENT ENLARGEMENT OF THE MOON AT THE HORIZON.—In the *Archives de Psychologie* (vol. v., No. 18, October, 1905) M. Ed. Claparède publishes an interesting paper on the causes which produce the impression that the sun, moon, and other celestial bodies are larger when near to the horizon than when seen at the zenith.

After discussing a number of theories propounded by previous writers on this subject, from Aristotle onwards, he examines several possible causes, and recounts the results of various experiments he has made whilst considering the matter.

Finally, he arrives at the conclusion that when we see the moon, or sun, at the horizon, we are surprised into believing it to belong to things terrestrial—to come into the class of objects which are by far of the greatest interest to us. As such we notice it with much greater attention, and for this reason overestimate its size. When at the zenith the moon is of little interest in comparison with the terrestrial objects which belong to our daily life, and we therefore think of it as relatively unimportant; consequently we underestimate its size. This correlation of importance and size is always common, and, as an illustration of it, M. Claparède quotes the fact that boys are always astonished when they learn for the first time that Napoleon was below the average height.



M. Claparède used the illustration we reproduce, in his experiments with individuals. Covering one of the moons shown, he asked his subjects to draw the other one the same size, and then asked them to draw the second whilst the first was covered. Of twenty couples of drawings thus obtained, from thirteen subjects of all ages, the moon at the horizon was shown as the greater on fourteen, as equal on five, and as less on one. The greatest difference was shown on two drawings by the same boy, where the moon was 9 mm. (horizon) and 4·5 mm. (raised) respectively, the actual diameter on the copy being 4·5 mm.

M. Claparède's paper may be obtained, as a separate brochure, from MM. Kündig et Fils, Geneva, price 1 franc.

MAGNETIC OBSERVATIONS DURING THE TOTAL ECLIPSE OF THE SUN.—We have received from Father P. Cirera, of the l'Ebre Observatory, an extract from the *Comptes rendus* giving an account of the magnetic records obtained at